

## **REMARKS**

### **Claim Rejections**

Claim 4 is rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Claims 1-5 are rejected under 35 U.S.C. §112, second paragraph. Claims 1-5 are rejected under 35 U.S.C. §102(b) as being anticipated.

### **Claim Objections**

In response to the Examiner's objection thereto, Applicant has amended Claim 3, as suggested by the Examiner, to recite "a routing structure."

### **Drawings**

It is noted that the Examiner has accepted the drawings as originally filed with this application.

### **Claim Amendments**

By this Amendment, Applicant has amended claims 1-4 of this application to address the Examiner's objection and rejections, as well as to better protect what Applicant regards as the invention. It is believed that the amended claims specifically set forth each element of Applicant's invention in full compliance with 35 U.S.C. § 112, and define subject matter that is patentably distinguishable over the cited prior art.

The amended claims are directed toward: a method for inter-cluster communication that employs register permutation, wherein clustered functional units have some global registers, and the clustered functional units exchange data ***without actual data movement*** by permuting the global registers of each cluster.

The cited patent application (2002/0108026 filed by Balmer et al.) describes a data processing apparatus comprising a plurality of functional units and a register file, where the first functional unit can utilize the second functional unit's output without waiting for the result being stored in the register file. It is a well-known technique called "data forwarding" or "data bypassing" in the literature.

Applicant teaches a method of data communication between multiple independent functional unit groups (said "clusters") where data cannot be exchanged directly (i.e. data cannot be transferred directly between two clusters through a register file). Balmer et al. teaches that data are normally exchanged through the register file, but that more circuitry can be added to bypass the register file and, thus, the data transfer need not wait for the register file accesses. It is important to note that the data is actually being moved in either case.

In comparison, Applicant teaches that a cluster possesses a local (private) register file and a global (public) register file, respectively, and the clusters exchange data by permuting the said global register files ***without actual data movements***.

Beyond data bypassing, Balmer et al. further teach means to deal with data communication between multiple clusters. However, the applied inter-cluster communication is classified as "extended accesses" (or more precisely "extended read") in Balmer et al.'s Fig. 20, which requires extra read access ports for the local register file in each cluster. In comparison, Applicant's invention does not need any additional access port.

Balmer et al. do not teach: a method for inter-cluster communication that employs register permutation, wherein clustered functional units have some global registers, and the clustered functional units exchange data ***without actual data movement*** by permuting the global registers of each cluster.

It is axiomatic in U.S. patent law that, in order for a reference to anticipate a claimed structure, it must clearly disclose each and every feature of the claimed structure. Applicant submits that it is abundantly clear, as discussed above, that Balmer et al. do not disclose each and every feature of Applicant's new claims and, therefore, could not possibly anticipate these claims under 35 U.S.C. § 102. Absent a specific showing of these features, Balmer et al. cannot be said to anticipate any of Applicant's amended claims under 35 U.S.C. § 102.

It is further submitted that Balmer et al. do not disclose, or suggest any modification of the specifically disclosed structures that would lead one having ordinary skill in the art to arrive at Applicant's claimed structure. Thus, it is not believed that Balmer et al. renders obvious any of Applicant's amended claims under 35 U.S.C. § 103.


**Summary**

In view of the foregoing amendments and remarks, Applicant submits that this application is now in condition for allowance and such action is respectfully requested. Should any points remain in issue, which the Examiner feels could best be resolved by either a personal or a telephone interview, it is urged that Applicant's local attorney be contacted at the exchange listed below.

Respectfully submitted,

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